Anatomy of Tmesipteris.—Miss SYKES[15] has investigated this interesting genus from material sent by Mr. A. P. W. THOMAS of New Zealand, comprising the two species *T. tannensis* and *T. lanceolata*. The genus consists of epiphytic species on tree ferns in New Zealand, Australia, and Polynesia. Only adult plants have ever been obtained, and the gametophyte is entirely unknown. Naturally the investigation by Miss SYKES has to do chiefly with the anatomy, and an outline of her results is as follows, in part confirmatory of previous work.

In the rhizome there occurs a protostele, which has usually two exarch protoxylem groups, but in passing to the aerial branch, pith arises in the center of the stele and quickly expands to form a large tissue. This is a case of a protostele passing directly into an ectophloic siphonostele, without the intermediate stage of an amphiphloic siphonostele; and all this occurs at a level at which no leaves have yet arisen. It was discovered that the course of the vascular bundles as described by BERTRAND for a sterile branch is exactly similar to that found in a fertile branch; that is, the single bundle entering the axis branches into three, the two lateral traces supplying the leaves, and the central one representing the vascular supply of the apex. In the fertile branches the central bundle supplies the synangium, and indicates to the author that the so-called "sporophyte" is cauline in nature, consisting of an axis bearing two leaves, and at its apex a synangium formed of two masses of sporogenous tissue that have fused over the tip. Attention is called also to the essential similarity in the formation of leaf and branch traces, it being claimed that the presence of a gap depends simply on the greater length of time elapsing between the division of a xylem group to form a trace and the departure of that trace from the stele. In fact, if the so-called "sporophyll" is really a sporophyll, the exit of its trace results in a leaf-gap; but according to Miss SYKES this is a branch-gap. The conclusion as to relationship, apparently inevitable in all such pieces of work, is that the Psilotaceae had better be retained as a separate division of Pteridophytes, the Psilotales.—J. M. C.

Rôle of certain elements.—The precise physiological rôle which the essential chemical elements play in plant life has long been an attractive subject for investigation. With advancing chemical knowledge the methods of experimentation have been greatly improved. It must be said that the older experiments have little value, and it is doubtful whether even the newest have very much, because the chemistry of the proteids is still such an enigma. REED has undertaken the study of the effects of four elements, potassium, phosphorus, calcium, and magnesium, upon certain filamentous algae, protonemata of mosses, prothallia of ferns, root tips of seed plants, and filaments of Basidiobolus.[16] His technique contains certain improvements; at the same time, on the score of the solutions used, it is

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[15] SYKES, M. G., The anatomy and morphology of Tmesipteris. Annals of Botany **22**:63–89. *pls. 7, 8. figs. 13.* 1908.

[16] REED, H. S., The value of certain nutritive elements to the plant cell. Annals of Botany **21**:501–543. *figs. 2.* 1907.

open to some objections, which, however, may be more theoretical than practical. From his observations on plants grown in the absence of certain salts, he draws conclusions as to the rôle of a particular element—a time-honored but nevertheless unsafe process. Some of these observations coincide with those of earlier observers, and others are to be added to the long list of specific effects previously recorded after like experiments. We cannot enumerate the results in detail. Assuming REED'S and all others as valid, no one is yet in a position to interpret this immense mass of data, many of them conflicting, and to frame any generalizations.

In his discussion REED clearly recognizes that the elements may either enter into the composition of some organ or substance in the cell, or without doing this permanently may act as catalysers, or in some other way may condition certain reactions. It is the varied possibilities within these categories that render useless at present all conclusions regarding the rôle of an element. The causal nexus is too intricate to be analyzed until far more knowledge of cell chemistry is available.—C. R. B.

Respiration and potassium cyanid.—Incited by the studies of animal physiologists on the effect of hydrocyanic acid and cyanids upon animal respiration, SCHROEDER set out to determine the effect of potassium cyanid upon the respiration of *Aspergillus niger*.[17] Of course "respiration" here means the intake of O_2 and the output of CO_2, processes which are quite independent of one another, and SCHROEDER'S results furnish further evidence, if any were needed, of this independence. Such investigations can hardly yield, as the author hopes, satisfactory "conclusions as to the chemism of vital functions," until it is possible to make a much more exact analysis of the fixation of O_2 and the evolution of CO_2 than is yet possible. Enough is known regarding the diverse sources of CO_2, however, to minify the value of superficial researches upon such obscure phenomena. The investigations themselves are extensive and thorough enough, but they necessarily deal with superficial phenomena.

SCHROEDER finds both the fixation of O_2 and the evolution of CO_2 strikingly reduced by potassium cyanid. The production of CO_2 is practically stopped, but the consumption of oxygen is not. The author is uncertain "whether this small intake of O_2 is to be considered as a vital process, or a purely chemical phenomenon," a phrase which indicates an unfortunate state of mind regarding "vital" processes. He does not think that the cessation of the evolution of CO_2 is a valid mark of death. (Obviously not, since it is well known that neither its evolution nor cessation has any definite relation to death.) The further distinctions which he makes between the action of HCN on the respiratory process "as a primary action . . . . and not as a phenomenon of death," seem quite invalid in view of our ignorance of the details of dissimilation.—C. R. B.

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[17] SCHROEDER, H., Ueber den Einfluss des Cyankaliums auf die Atmung von *Aspergillus niger*, nebst Bemerkungen über die Mechanik der Blausäure-Wirkung. Jahrb. Wiss. Bot. 44:409–481. *figs.* 2. 1907.